



Brucellosis Study: INL researchers advance detection of pathogen

What do cattle ranchers in the greater Yellowstone region have in common with British soldiers garrisoned on the island of Malta in the late 1800s? Hint: it's a pathogen that starts with the letter B. It's *Brucella abortus*. Soldiers and ranchers alike fear this bacterium because it's a natural pathogen and biowarfare agent that can injure humans and animals.

Scientists at Idaho National Laboratory have been studying this pathogen for over 10 years.

"Because of the state-of-the-art molecular research we were doing – looking at Yellowstone microorganisms, the park rangers involved in research permitting asked us whether we could help on the Brucellosis problem," said INL molecular microbiologist Frank Roberto, Ph.D.

Species of the *Brucella* bacterium can cause brucellosis – an infectious disease that makes bison, elk and cattle abort their calves. If brucellosis is found in cattle, a state's brucellosis-free status can be jeopardized. In humans, the presence of this bacterium can make people very ill and incapacitate them.

"Bison and elk are believed to be the primary reservoir of the disease that remains in this region, and we're concerned about it because it can be transmitted to cattle," said Roberto. "There've been literally millions of cattle that have been eliminated from herds over the years to try to get rid of the disease in that particular animal population."

Brucellosis is a persistent health and environmental problem for wildlife within the Greater Yellowstone Region, and INL microbiologists are improving tests to detect active *Brucella* infection in animals.

"What we've been working on is delivering a DNA diagnostic for the presence of *Brucella*," said INL molecular microbiologist Deborah Newby, Ph.D. "And what this is, is – it's a technique using real time PCR. What that means is it's a Polymerase Chain Reaction. It's using an enzyme to go in and make millions to billions of copies of a specific sequence of DNA – that's unique to our target organism, in this case, *Brucella*. And so, it allows us to get a rapid fluorescent signal generated, that's indicative of the presence of this particular organism in whatever sample it may be. Whether it's a soil sample, a blood sample, an amniotic fluid sample. So, it allows us a very rapid and sensitive and specific mechanism of detecting *Brucella* DNA."

The important work these researchers are performing at INL is going a long way to identify, understand and control the spread of Brucellosis. And, because a species of Brucella has been weaponized, their work contributes to information needed by those responsible for national security and homeland defense. With the knowledge these INL researchers are gaining, they are making a contribution to the health of humans, cattle and wildlife in the greater Yellowstone area.